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PALESTINE REFUGEE PROBLEM

Notes on Agriculture in Syria
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INTRODUCTION

During a tour of Lebanon in March last a short visit was paid to Damascus to consult the Director of Agriculture regarding the present position and future prospects of growing groundnuts in Western Syria, and with his approval a two-day tour was made of the region concerned. On that occasion the possibility of making an extended tour of Syria at a later date was discussed with Amin Nasif Bey, Director of Agriculture. Subsequently, a cordian invitation was received from the Government of Syria, through the British Legation in Damascus, to pay a visit of some duration, so that I might see agricultural conditions, and study possibilities in the different parts of the republic. This invitation was accepted with great pleasure and 19 days from 25th May to 12th June were spent in the country.

The time chosen for this visit was particularly suitable to see conditions and to form an opinion of future agricultural possibilities. Syria's agriculture, like that of neighboring territories where artificial irrigation is limited, is largely of the one-season-a-year type. The rainy season, which extends in this area of the Middle East from October to April, had been more prolonged than usual: vast areas of the country were covered with crops, mainly cereals and legumes, which were either in process of being harvested or were approaching that stage: combine-harvesters, which are a feature of the agriculture of certain tracts, were at work in the field in some districts and in others were being tuned up in preparation for action.

On arrival in Damascus I was met by Mr. Broadmead, Minister, British Legation, whose generous hospitality I enjoyed during my halts in Damascus. Before commencing a tour of the country I was received by H. E. Said el Ghazzi, Minister of National Economy, to whom I was introduced by Mr. Halsey, Commercial Secretary, British Legation. We were accompanied by Amin Nasif Bey, Director of Agriculture. H.E. gave me a warm welcome to Syria, discussed a number of aspects of its agricultural economy and was pleased to direct Amin Nasif Bey to afford all facilities so that I could visit the different parts of the country and see at first hand the conditions which maintain. He also gave a lunch party in delightfully cool and pleasant surroundings on the outskirts of Damascus, at which I had the advantage of meeting several of the senior officers of the Government.

The first two days were spent at Damascus with Amin Nasif Bey in drawing up a tour programme and making the necessary arrangements for travel, in visiting departmental institutions in and around Damascus and in seeing at work some industries which depend on agriculture for their raw products. I also had the advantage of meeting Messrs. Bracken & Pickett, American Agronomist and Horticulturist respectively, employed on short term contracts with the Syrian Government, and of obtaining some particulars of their work, prior to seeing it in operation during the course of my travels throughout the country.

Thirteen days were then spent in a very extensive tour of Syria from the Transjordan frontier in the south to the Turkish border in the north, and from the villages of Djeziret ibn Omar on the Tigris in the north-east corner of the Jezireh and of Tell Kotchek on the Iraq frontier to the shores

of the Mediterranean in the West. In the course of these travels some 1800 miles were covered by road - or by track where no road existed - by car, station wagon and jeep. Amin Nasif Bey acted as guide, philosopher and friend throughout, and in none of these directions could one have found his superior. His knowledge of agricultural conditions in every corner of the Republic is extensive and no enquiries, however detailed, find him lacking in information.

Finally on our return to Damascus two days were spent in making contact with officials from whom information and data arising from observations throughout the country were desired, and in discussions with others on different problems associated with the country's main industry. I also had the privilege of another talk with H.E. The Minister of National Economy during which I briefly stated my general impressions.

It is difficult to express adequately my appreciation of everything that was done to make my visit useful, pleasant and memorable. To H.E. Said el Ghazzi I am greatly indebted for the very full facilities he placed at my disposal to enable me to study agriculture in the remotest corners of the country and to obtain the fullest information concerning it, and for the generous hospitality he extended to me. To Amin Nasif Bey I am deeply grateful for the excellent arrangements he made to show me the country, for the unfailing good humor and courtesy with which he responded to my unceasing quest for information during the many hours we spent together daily, for the very full facilities which he afforded me to see his Department's activities, and for all he did to ensure my comfort and well-being throughout our tour. From his staff also I received the maximum help and information possible.

The hospitality and assistance that I received from a number of Syrian gentlemen at different points in the tour are remembered gratefully. By reason of the former I was able to spend more than one night in comfort in a well-appointed home in a town where good public accommodation is at our disposal, but himself drove it for about 150 miles when our own transport proved unequal to the bad roads - and lack of them - in one part of the country. A local Sheikh came to our rescue on another occasion with his private car when we were stranded at nightfall with a broken axle some 60 miles from our headquarters.

Mr. Broadmead and his senior officers at Damascus left nothing undone to make my visit to Syria a success. Apart from making the initial arrangements for it, the generous hospitality of their tables and homes not only made my stay pleasant and memorable but gave me several opportunities of making useful contacts with senior officials of the Syrian Government and with private individuals interested in agriculture or in industries depending on it for their well-being.

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PREFACE

Recent reports on Syrian agriculture by agricultural experts are not lacking. Kean's book "The Agricultural Development of the Middle East" gives some general but brief information, based on his tours of the country in 1944 and 1945. Following a survey of about a year's duration, Sir Alexander Gibb and Partners reported on the economic development of Syria in 1947. Their investigations covered a wide field and agriculture, as the principal industry of the Republic, received considerable attention. In 1946 a United States' Agricultural Mission of three technical specialists spent a month in making a survey of Syrian agriculture and later presented to the Government of the Republic a report embodying their views and recommendations on various aspects of agriculture development.

Published information on the agriculture of Syria is meagre, however, and detailed data are not readily available to those interested in the subject. A knowledge of conditions as they exist today is essential before consideration can be given to the lines on which the country's main industry can be developed most profitably and to the facilities which must be provided in order to achieve that development. The opening chapters of this note, therefore, endeavour to present data relating to present conditions from a number of angles. These data are intended to serve as a background against which to view the present and future. If their presentation has made the note unduly long, their importance in relation to planning for the future and the fact that the information which they give is not widely obtainable must be the justification.

For those who already possess a general or detailed knowledge of the facts given in the earlier chapters, the main interest in this note will probably be in the concluding chapter in which some suggestions have been made in regard to the future. They have been based on experience in similar connections in other countries. Those who have presented the reports on Syria's agriculture to which reference has just been made, have drawn similarly in their experience which in general have lain more in Western ... than in Eastern countries. The suggestions in the present note are prompted on the basis of a considerable knowledge of and a long personal connection with the agriculture of the East with which that of Syria has many affinities.

I.

GENERAL FEATURES OF SYRIA'S AGRICULTURE

In a comparatively short note it is not possible to describe in detail all aspects of agriculture in Syria or to do more than refer to its most outstanding features. Consequently, many items of interest which were observed find no mention here, though in some cases much could be written concerning them.

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2. From at least two angles Syrian agriculture may be considered to be one-sided. Seasonally it is badly distributed and, apart from the limited cultivation done under irrigation and such cropping as is possible in the dry season in the relatively higher rainfall areas where the soil retains enough moisture for plant growth, it is almost one-season-a-year system. Further, the range of crops grown on any substantial scale is extremely limited. Cereals constitute almost a monopoly among field crops. From statistics which are quoted elsewhere it appears that they occupy an area approaching 3,300,000 acres out of an annual total area of less than 4,000,000 acres under general field crops. Amongst cereals themselves wheat accounts for more than two million acres, and barley for nearly one million acres. Whether in what direction and to what extent a more balanced agricultural economy could be practiced will be considered later.

2. Rainfall

About 88% of the cropping is done under rainfed conditions. Rainfall is seasonal and occurs during October to April annually. The remaining months are rainless, and hence summer cropping is not generally possible. The distribution of the rainfall through the country is uneven, so much so that over enormous areas the small total received is inadequate for maintaining plant life and much of the territory is desert. In no part of the republic does it appear that the average maximum rainfall exceeds 40 inches and that occurs only in the region of the Anti-Lebanon mountains. Generally speaking Latakia and Aleppo, the former on the Mediterranean with about 35 inches and the latter in the north-west corner with 15-30 inches, according to locality, are the most favoured districts. To the south of them rainfall tails off till it is of the order of 10 inches - less in some places in Damascus and Horan district in the south-west corner. Much of the eastern part of the country is no better off. Deirjes Zor on the Euphrates receives an average of less than 6 inches of rain annually. Passing north and east the rainfall improves till at Hassetche in the Jezireh it exceeds an average of 11 inches and cultivation begins to be possible: ultimately at Kamichliye on the northern frontier with Turkey it averages about 20 inches.

3. Irrigation

Of the estimated area of 5 million acres under cultivation only one-eighth, or approximately 700,000 acres are believed to be irrigated. 80% of the irrigation is done from rivers: springs and wells provide the remainder. The Euphrates district accounts for 45 - 50% of the irrigated area, Damascus nearly 25%, the Jezireh about 12%, Aleppo district 10%, and the other five districts together the remaining 15%.

Irrigation water may reach the land by direct gravity flow from the rivers and streams, as in Damascus where the sloping nature of the country permits irrigation channels to take off the main river at different levels, or, as in the Euphrates and Jezireh districts, it may be necessary to use some form of lift which is usually either of the ancient Persian wheel type operated by bullocks, or the automatic wheel (noriah) which is so constructed and sited that it is driven by the natural flow of the river itself. Modern engine-driven pumps are also used in considerable numbers.

of the river has been diverted into a canal by gravity flow. Initially the water is led from the river for a short distance through an underground tunnel from which it emerges into a deep cut and gradually comes to surface level as the land slopes away downstream. The upper reaches of this canal system have been completed and irrigation is being done from it. Construction is still in progress in the lower reaches and it is understood that three years will elapse before the system is complete. When finished, water will be carried to an area north of Hassetcha. It is understood that the area for which the scheme will cater finally is expected to be about 20,000 acres, but it is not known whether it will consist of land now entirely rainfed or will include some areas irrigated at present by lift from the river.

So far as was ascertained these are the only major irrigation schemes in Syria at present. Even though irrigated farming can never be possible from the rivers in Syria on a scale representing more than a very small fraction of what can be achieved from similar sources in the adjoining kingdom of Iraq, it seems certain that much greater use than at present can be made of Syrian river waters with great economic advantage to the country. It is understood that such possibilities are already known to Government by preliminary surveys which have been made or by specific schemes which have been advocated.

4. Power Farming

Mechanized cultivation is very popular in certain areas of Syria and if the rate of its expansion is somewhat slow, the reason is to be found in the short supply position of tractors and their complementary implements and machines rather than in any lack of appreciation of their merits or of keeness to develop this type of farming. From the physical aspect several areas of Syria, notably the Homs-Hama-Aleppo tract and the Jezireh, are veritable paradises for the mechanically-minded cultivator in that there exist hundreds of thousands of acres of flat or gently undulating, stoneless, treeless, unbroken country, as perfect for mechanized cultivation as any place in the world.

It is reckoned that at present there are some 300 tractors in operation in Syria. In the distribution of tractors and their machinery during the war preference was given to areas from which the maximum production was likely to result from their use. Thus the Jezireh fared best of all districts. It is believed to have today about 200 tractors and some 140 combine-harvesters. The Homs-Hama-Aleppo area and the Akkar Plain in Latakia district are other areas where tractor cultivation is considerable.

All the tractors in the Jezireh are of American origin. Standardisation of type has been impossible owing to short supply and would be tractor owners are glad to take anything that is available. For this reason the types and makes in operation in this area are many and varied. It is estimated that their distribution is roughly 10%. Cess; 25%. John Deers; 20%. International (some track type: some wheel type): 30%, Caterpillar; 25%, all other makes it which are included 3 new Allis-Chalmers, the first of their kind to be used in this territory. Such a

variety greatly increases the difficulty of making adequate provision for efficient maintenance and a full range of spares.

On the whole it appears that tractors and other machines are usually the property of private cultivators rather than of contractors. The Syrian Government does not operate a tractor contract service such as functions in Great Britain and, on a very much smaller scale, in Iraq. Contractors do not exist. Some of them take land on contract and themselves farm it by tractor. They pay rent in kind at the rate of 7 - 8% of the harvested produce of the land. Combine-harvesting when done on contract for cultivators is normally paid in kind at 12½ - 15% of the produce harvested. It is said that the scarcity of oil and fuel in the current season has resulted in an enhancement of this rate to 25%.

5. Fertilisers.

So far chemical fertilisers are used on a very small scale in Syria. It is said that scarcity of the commodity is partly responsible but when that condition did not maintain some years ago the consumption appears not to have exceeded 2,500 tons a year in Syria and Lebanon combined. Lack of knowledge of the economics of applying this form of manure to the various crops still stands in the way of its widespread use. Much investigational work to determine the effect of using the different forms and kinds of fertiliser and the optimum quantities to apply to the different crops has to be done by the Agricultural Department before the economics of fertilisers are known. A beginning in this connection has been made recently but it requires considerable expansion if data are to be forthcoming within a reasonable time.

6. Pests and diseases of crops.

Syria appears to be fortunate in having freedom from many of the pests and diseases which cause great loss and damage elsewhere. Entomologically its main enemies are the Moroccan locust and the "Sunni" pest of grain. In both cases cooperation and collaboration in control measures are necessary with the adjoining countries which suffer from the same pests. In dealing with locusts collaboration with Iraq already exists. Rust of wheat is probably the most serious loss-causing crop disease. Attempts to overcome it by the introduction of rust resistant strains of wheat are being made. Reference only to these major enemies does not mean that Syria escapes all other pests and diseases.

7. Crops.

(a) Jebel Druze district

This hilly district, in which the rainfall is of the order of 12 inches a year, mainly grows wheat and barley - about 85,000 acres of the former and 21,000 acres of the latter. Vetches occupy about 10,000 acres and chickpeas and lentils about 6,000 acres each. The areas and chickpeas and vegetables are negligible.

(b) Horan district

Out of a total cultivated area exceeding half a million acres only about 10,000 acres are irrigated at present. The average annual rainfall is only 11 inches. The water is said to be held communally by the village, and to be distributed every year amongst the cultivators. The system militates against improvement in farming practices since there is no certainty that a given individual will get the same piece of land in successive years. A feature of parts of the district is the extremely stoney nature of the land. Nevertheless, there are, as between Cheikh Meskine and Deraa, large stretches of open country with good land suitable for mechanised farming. The nature of the soil is such that mere cultivation, as opposed to inversion by ploughing, would be adequate for crop growing purposes.

The principal crops of the district are wheat (125,000 acres) barley and millets (25,000 acres each), chickpeas (18,000 acres) and lentils (10,000 acres). Small areas of vetch, rice, maize, and cotton are grown. Amongst vegetables watermelons, cucumbers and onions occupy the principal places, but in each case the area does not exceed a few hundred acres. Grapevines and olives constitute the main fruits but again the areas are extremely small.

(c) Damascus district

In this district the average rainfall varies from 3-38 inches according to distance from the Anti-Lebanon mountains. Out of a total cultivated area of 350,000 acres, almost half (160,000 acres) are irrigated. Around Damascus city the land is very fertile, well manured and intensively cropped with fruit and field crops. Orchards are a feature.

When travelling north irrigation ceases from Douma which is only a few miles outside Damascus. The top of the Anti-Lebanons is a vast plain of varying width. Soumac, a bushy type of shrub from whose leaves tannin is extracted grows here. Nebek, at an elevation of 4,000 feet is a wheat country, bare and treeless. Windmills which pump water to houses and gardens are a feature of the landscape around this village and Deir Attiye. At the latter village a Cooperative Society is said to own one tractor.

Wheat (about 97,000 acres) and barley (about 72,000 acres) constitute the principal crops of the district but considerable areas are under other crops also. The 17,000 acres of maize constitute about a quarter of the total area under this crop in Syria. Chickpeas (8,000 acres), millets (6,500 acres), potatoes (5,000 acres) and lentils (4,300 acres) are the other main crops. Of the 12,000 acres of hemp grown in Syria, the district of Damascus produces about three quarters.

Amongst vegetables tomatoes, cucumbers, onions, egg plant, water melon and musk melon, in descending order of area, are the chief of those grown.

Amongst fruits Damascus grows one-eighth of the grape vines of Syria, about 60% of the apricots, 75% of the walnuts. Smaller areas are cultivated under olives, figs, apples, pears and almonds.

(d) Homs district.

Except for the high land towards Hasslye where the soil is stoney and poor the western area of this district is good agricultural country with great stretches of flat or rolling treeless land admirable for mechanised cultivation. Of the estimated 250,000 acres under cultivation only 19,000 acres are irrigated. Rainfall is about 23 inches.

Wheat, barley, and millets occupy the largest areas of field crops at approximately 110,000, 70,000 and 35,000 acres, respectively. On a lesser scale vetch, chickpeas, and maize are grown. The watermelon is the principal vegetable in the district and occupies an area exceeding 16,000 acres, the area under other individual vegetables does not exceed a few hundred acres.

At 13,000 acres the district grows about one-tenth of the grape vines in the country. Olives occupy 1,600 acres and apricots 1,200 acres, wilst walnuts, figs, apples, etc. are represented by small areas.

(e) Hama district.

This district is estimated to have a total cultivated area of about 1¼ million acres of which only 24,000 acres are irrigated. The average annual rainfall is 16-17 inches in the western cultivated tract. The land is variable in quality; thus, on the road to Selemiyeh much of it is hilly, but produces a fair crop of wheat; nearer Selemiyeh is a large fertile irrigated valley carrying excellent crops: the road northwards to Aleppo passes through open rolling country, produces a wheat crop usually very good in outturn and is well suited to mechanised farming. Wheat (150,000 acres), barley (88,000 acres), millets (20,000 acres), lentils (18,000 acres), vetch (12,000 acres) are the principal crops. Smaller areas of chickpeas, beans and maize also find places amongst the field crops in this district.

Among vegetables Hama is essentially a melon producing district. The area under water melons (70,000 acres) represents more than 50% of the area of this crop in Syria. Musk melons occupy 13,000 acres, or 30% of the total area under this crop. The area under any other vegetable crop is negligible.

Fruits are relatively unimportant in this district. There are about 6,000 acres of grape vines. The total area under other fruits - walnuts, apricots, fig, almond, etc. does not appear to exceed 2,500 acres.

(f) Aleppo district.

Though in Aleppo district the total cultivated area (1,400,000 acres of which about 70,000 acres are irrigated) does not appear to greatly exceed that of the neighbouring district of Hama, its agriculture is much more diversified and Aleppo is, in fact, at present the most important crop-producing district in Syria.

Amongst ordinary field crops Aleppo grows 680,000 acres of wheat, which represents one-third of the total area under wheat in the country, 400,000 acres of barley (about 45% of the entire barley area), 30,000 acres of millets (one-eighth of the total), 75,000 acres or 60% of the total vetch crop, 23,000 acres of beans - 55% of the total beans, and considerable areas of other crops. The district is notable also in that its cotton area of 42,000 acres, grown under rainfed conditions, represents 85% of the whole cotton area in Syria, whilst its 6,500 acres of sesame are more than 40% of the Syrian sesame crop.

In Aleppo, as in Hama, melons constitute the principal vegetable crops. Its 26,000 acres of water-melons and its 23,000 acres of musk melons represent 20% and 55% respectively, of the country's area of these crops. Again its 6,600 acres of tomatoes and 5,500 acres of cucumbers amount to 45% and 60% of the total areas of these crops. Of 10,000 acres of onions grown in Syria, Aleppo district contributes almost 30%.

Of no less importance is Aleppo's fruit production. Its range of fruits is wide and the areas very extensive. Thus

	Area in Aleppo district Acres.	Proportion of total area under same crop in Syria. %
Olives	140,000	73
Grape vines	89,000	55
Pistachios	6,000	95
Figs	6,700	24
Pomegranates	4,000	84
Apricots	4,200	25
Almonds	3,400	44

No other district in Syria can compete with this record, in point either of variety of products or of the total quantity produced.

(g) Latakia district

The agricultural area of this district lies mainly in a strip of country of varying width adjoining the Mediterranean Coast. The total cultivated area in the district is considered to be 630,000 acres of which only 32,000 acres are irrigated. Annual rainfall is around 35 inches.

Amongst ordinary field crops Latakia grows about 180,000 acres of wheat and 90,000 acres of barley. Its acreage of oats, chickpeas, millets, maize and tobacco are greater than those of any other district. They are 15,000, 24,000, 94,000, 28,000 and 11,000 acres respectively. In the case of oats, this area is 77%; in that of millets 40%; in that of maize 48%, and in tobacco 94% of the total areas under these crops in Syria.

Amongst vegetable crops Latakia has a larger area (3,000 acres) under onions than any other district, is the second largest producer of tomatoes (2,900 acres) and occupies third place for musk melons (3,400 acres).

In fruit the district is second only to its neighbour Aleppo in its area of olives (46,000 acres or 20% of the total). In fig growing it occupies premier place among districts with 16,000 acres of a total area of 28,000 acres in the country whilst it almost monopolises mulberry production, since it grows 12,000 acres of the total area of 13,000 acres under this fruit in Syria. Apricots, apples, pears, walnuts and almonds occupy small areas relatively.

(h) Euphrates district

This district has probably the lowest rainfall of any district in Syria. At Deir ez Zor it averages only 5.7 inches annually. On such a rainfall crop production is impossible and irrigation is essential to successful farming. This is borne out by statistics which show that of the total cultivated area of 352,000 acres, the irrigated portion amounts to 317,000 acres.

In this district the cropped area lies along the Euphrates and the lower reaches of the River Khabour before it unites with the former at Bessira. Along the Euphrates cultivation is usually restricted to a valley of varying width lying between high land on both banks. Thus it is impossible to utilize the waters of this river on any large scale throughout most of its length through Syria unless the water can either be headed up and impounded in a reservoir so as to raise its level or be lifted to the level of the higher land. For the latter development cheap hydro-electric energy would seem to be indispensable.

The only field crop which occupies an area of any considerable size is wheat (118,000 acres). Barley is grown to the extent of 28,000 acres; millets occupy 20,000 acres. Small areas of rice and sesame represent almost the only other crops. Watermelon (3,200 acres) is the only vegetables of any importance, whilst the total area of fruits of all other kinds in the district does not appear to exceed 200 acres.

(i) Jezireh district

Cultivation in the north of this district is said to be of comparatively recent origin and to have begun on a scale of any importance only within the last quarter of a century. Irrigated farming on the River Khabour is probably of much longer standing; the remnants of barrages on the river and of canals adjoining it, give evidence of cultivation by irrigation in bygone days.

A feature of the Jezireh is its relative isolation. The railway from Mosul to Aleppo passes across its northeast corner and along its northern frontier with Turkey, but road communications is difficult and at times during the rainy season parts of the district are completely cut off for road transport. Hassetche, the capital, is located 95 miles north of

Deir ez Zor. At present there is no metalled through road. Portions of the road have been metalled at both ends, but for a long distance in the middle of the road is rarely a track across the desert. An identical position exists over the 55 miles separating Hassetche and Kamichliye but in this case, owing to the heavier rainfall in that area than further south, road communication sometimes becomes impossible between these towns whilst it always is possible between Deir ez Zor and Hassetche. Over the rest of the district, except for short stretches, e.g. to the east and west of Kamichliye, there are few real roads and transport makes its way across country as best it can.

South-west of Hassetche to the Euphrates border the land is desert for the rainfall is insufficient for arable farming and at most the land produces sparse grass. Along the River Khabour from Ras el Ain on the Turkish frontier across the district and down its eastern side irrigated farming is practiced by means of water raised from the river by large noriahs (automatically-driven water-wheels) approaching 25 feet in diameter. The Tell Megans irrigation should already described also functions to the north east of Hassetche.

North of Hassetche where it averages 11 inches a year, rainfall increases till at Kamishliye on the northern frontier it is 20 inches. Rainfall cultivation, therefore, begins to the north of Hassetche and although for the first 15 miles the crops are usually light, their quality increases rapidly to the north. Roughly speaking an area of perhaps 30 miles depth and extending along the northern frontier produces good, and often excellent crops.

So far as could be gathered, it appeared that much of the land is in the hands of large cultivators. Mechanised farming is a feature of the district. The number of tractors operating in it at present is said to be about 200 and of combine-harvesters 140. Land in the northern area is sometimes rented by contractors for cultivation; the rent is paid in kind and is usually about 7 - 6% of the produce harvested. Very large areas in the district are admirably adapted to mechanised farming and there is scope for a very large increase in the number of tractors and other machines.

East of Kamichliye towards the north-east corner of the district there are large uncultivated areas which carry a fine crop of wild grasses. Much of the land in that corner is thickly covered with wild white clover and red clover also. Some of this country is too stoney for arable farming, particularly of the mechanised type, and livestock rearing would obviously offer possibilities.

Wheat and barley at present constitute the only crops grown on any appreciable scale in the Jezireh. The areas under them - 465,000 acres of wheat and 130,000 acres of barley - are second only to the areas occupied by these two crops in Aleppo district. All other crops combined appear to cover no more than 20,000 acres to which millets contribute 6,000, lentils 5,000, and rice 8,000 acres.

Melons are the only vegetables which are grown to any extent. About 9,000 acres are under water melons and 1,200 acres under musk melons.

So far fruit growing finds very small place in the economy of the Jezireh. There are said to be about 200 acres of grape vines and 150 acres of apricots. Parts of the district seem to be well suited to an expansion of fruit growing.

The Jezireh is only yet in the initial stages of development. Its rainfed lands offer large scope for the profitable expansion of agriculture, whilst the waters of the River Khabour, if harnessed and fully utilised, can be a source of great economic gain and prosperity both to the district and to the country as a whole.

II.

AGRICULTURAL STATISTICS

From the statistical point of view it is usually difficult to present a complete or accurate picture of the agriculture of Middle East countries, since few of them have yet organised the collection of such data on sound, reliable lines. Any statistics which exist are rarely more than estimates and approximations, but data even on that basis are often obtainable or very imperfect. Syrian figures do not yet carry the enquirer beyond the realm of estimates, but within those limits Syria has gone ahead of many of its neighbours in that it has compiled and printed up a variety of data in considerable detail.

The most recent information on agricultural statistics in Syria is to be found in a pamphlet, published in 1947, covering data for 1946. The general nature of the data contained in this publication, which extends to 115 pages may be judged from the following summary of its principal heads:-

1. Annual rainfall and its monthly distribution at 18 rain gauge stations.

2. Population (male and female separately) in each of Syria's nine districts (mahafazats) and 42 subdistricts (qaza).

3. Number of agricultural labourers by districts.

4. Cultivated areas (rainfed and irrigated separately) by districts.

5. Subdivision of irrigated areas - by rivers, wells and springs - by districts.

6. Classification of uncultivated areas and of pastures, by districts.

7. Area and production of each of the principal field crops by sub-districts.

8. Area and production of fruit of different kinds by sub-districts.

9. Area, production and average yield per hectare of each crop for the country as a whole.

10. Area, production and number of fruit trees (total and bearing separately) for the whole republic.

11. Industrial output of agricultural products.

12. Forest areas by districts.

13. Number of livestock of different kinds; quantities of livestock products for the country as a whole and by districts.

14. Imports and exports of livestock, with countries of origin and destination.

15. A variety of miscellaneous data such as, number of livestock slaughtered by districts; sales of cereal grains to MIRA, to Lebanon and municipalities; stocks of grain in hand at end of year; areas of crops devastated by insects in each district; number and kinds of agricultural machinery by districts; number of villages in each of the 42 sub-districts.

Since this publication is not widely available and also as it is printed throughout the Arabic language, the most important data have been reproduced from it after converting them into their equivalent English units of measurement of area and volume. Various additional calculations have also been made and shown in the tables which follow. In presenting them emphasis is laid on their being estimates and not actualities. They have not, therefore, been given usually to the last cypher.

I. Average annual rainfall at 18 raingauge stations

District	Station	1946 mms.	Average of Previous 13 years mms.		inches	
Damascus	(Quanaitra	768	968	-	38.7	(11 years only)
	(Qatana	269	263	-	10.5	(12 years only)
	(Damascus	152	217	-	8.7	
	(Zabadahi	486	590	-	23.6	(6 years only)
	(Qataife	148	-			
	(Nabek	194	-			
Horan	Derea	229	281	-	11.2	
Jebel Druze	Soueida	300	-		-	
Latakia	Tartous	775	-		-	
Homs	Homs	560	592		23,7	
	(Hama	349	372	-	15.9	
	(Selemiyeh	330	432	-	17.3	
	(Jisr es Chorhour	493	782	-	31.3	(11 years only)
	(Idlib	451	501	-	20.0	
Aleppo	(Aleppo	390	397	-	15.9	
	(Aafrine	405	486		19.6	(9 years only)
Euphrates	Deir ez Zor	179	143	-	5.7	
Jezireh	Hassetche	405	271	-	11.2	(12 years only)

II. Distribution of total area.

	Acres	Percentage of total area.
Cultivated	5,725,000	12.3
Pastures	10,121,000	21.8
Forests	1,042,000	2.3
Cultivable	8,400,000	18.1
Unculturable	7,037,000	15.2
Mountains, swamps, desert.	14,076,000	30.3
	46,401,000	100.

Data from another source show the following distribution:

1. Inhabited Areas.
   (a) Cultivated or culturable

	Acres	Percentage of totals		
Irrigated	809,000	6		
Rainfed	12.753,000	94		
	13,562,000	100	68.2	
(b) Unculturable	6,333,000		31.8	
	19,895,000		100	42.9
2. Desert Areas.	26,506,000			57.1
Total.	46,401,000			100.

It will be observed that these figures do not agree in all cases with those against corresponding heads in other tables, thus emphasizing that all figures must be regarded as estimates only.

III. Distribution of population, cultivation and irrigation

District (Mohafazat)	Population	Cultivation (in 000 acres) Rained	Irrigated	Total
Damascus	652,182	196	158	354
Homs	219,532	356	19	375
Hama	163,654	1223	24	1247
Horan	116,162	517	11	528
Euphrates	229,232	45	308	353
Jezireh	149,003	695	88	783
Aleppo	896,559	1228	70	1298
Latakia	467,624	603	32	635
Jebel Druze	82,867	152	---	152
Total	2,949,815	5,015	710	5,725
Percentage of total		87.6	12.4	100

The irrigated area is further sub-divided as follows:

	Area (in 000 acres)	Percentage of total irrigation.
Irrigation from rivers	575	81
	99	14
	36	5
	710	100

IV. Distribution of uncultivated area and pastures.

District	Uncultivated area (in 000 acres) Unculturable	Cultivable	Total	Pastures (in 000 acres) Village Grazing	Desert Grazing	Total Pastures
Damascus	469	728	1,197	49	296	345
Homs	3,575	68	3,643	12	2,500	2,512
Hama	157	100	257	-	-	-
Horan	327	10	337	22	-	22
Euphrates	790	2,956	3,746	300	2,965	3,265
Jezireh	136	1,796	1,932	312	3,127	3,438
Aleppo	1,127	2,463	3,590	85	305	390
Latakia	455	128	583	106	-	106
Jebel Druze	-	151	151	22	20	42
Total	7,036	8,400	15,436	908	9,213	10,121
Percentage of Total	46	54	100	9	91	100

V. Area and production of the principal crops

	Area (acres)	Production (tons)
Wheat	2,026,200	567,900
Barley	927,000	282,400
Oats	19,500	9,000
Rice	19,000	12,000
Millet	237,400	58,900
Maize	59,200	27,500
Lentils	106,500	19,500
Beans	40,100	13,600
Chickpeas	85,400	17,000
Vetch	123,600	36,700
Vetch	13,800	2,200
Peas	800	150
Sugarcane	230	2,100
Sesame	15,500	3,000
Groundnuts	1,000	500
Linseed	400	160
Castor	300	70
Cotton	49,600	4,800
Hemp	11,900	10,400
Tobacco (cigarette)	11,400	10,000
Tobacco (hubble-bubble)	1,300	400
" (local)	7,900	2,000
Alfalfa	2,200	15,200

VI. Area and production of the principal vegetables.

	Acres	Tons.
Potatoes	8,300	15,100
Kumin	2,700	440
Aniseed	1,600	370
Fenugreek	1,300	300
Caraway	1,900	600
Water Melon	130,600	500,700
Musk melon	42,600	96,200
Squash	8,300	11,400
Cucumber (green)	11,100	13,600
do (seed)	3,000	130
Lubia	6,400	2,900
Ochra	1,800	7,000
Tomato	14,600	40,900
Egg Plant	6,200	12,000
Pepper	2,700	3,400
Radish	600	5,100
Lettuce	1,100	25,000

Turnip	1,800	14,000
Beetroot	1,050	9,200
Cabbage	850	8,300
Cauliflower	930	8,400
Carrot	500	3,900
Onion	10,100	40,200
Garlic	4,000	8,800

VII. Area and production of the principal fruits.

	Area in acres		Production (tons)
	Total	Bearing	
Olive	195,300	144,000	41,900
Vine	147,200	117,000	170,600
Apricot	16,700	13,300	21,300
Apple	5,600	4,000	5,700
Pear	3,700	2,200	1,500
Walnut	16,200	11,300	5,800
Almond	7,800	6,500	2,100
Pistachio	6,200	3,700	11,800
Fig	28,300	21,100	46,100
Pomegranate	4,800	3,500	13,300
Quince	1,300	1,000	700
Mulberry	13,200	12,600	24,500
Cherry	2,700	1,800	2,000
Almond	7,800	6,500	2,100
Plum	1,500	1,000	1,700
Orange	3,400	1,700	1,800
Lemon	360	150	400
Mandarin	110	70	150
Loquat	120	90	120

VIII

Number of Livestock

Draft cattle

(a)	Bullocks	221,900
(b)	Cows	149,400
	Total draft cattle	371,300

Milch cows	73,200
Horses	110,700
Mules	49,100
Donkeys	232,200
Camels	47,800
Buffaloes	5,400
Sheep	3,259,600
Goats	1,257,300
Pigs	400

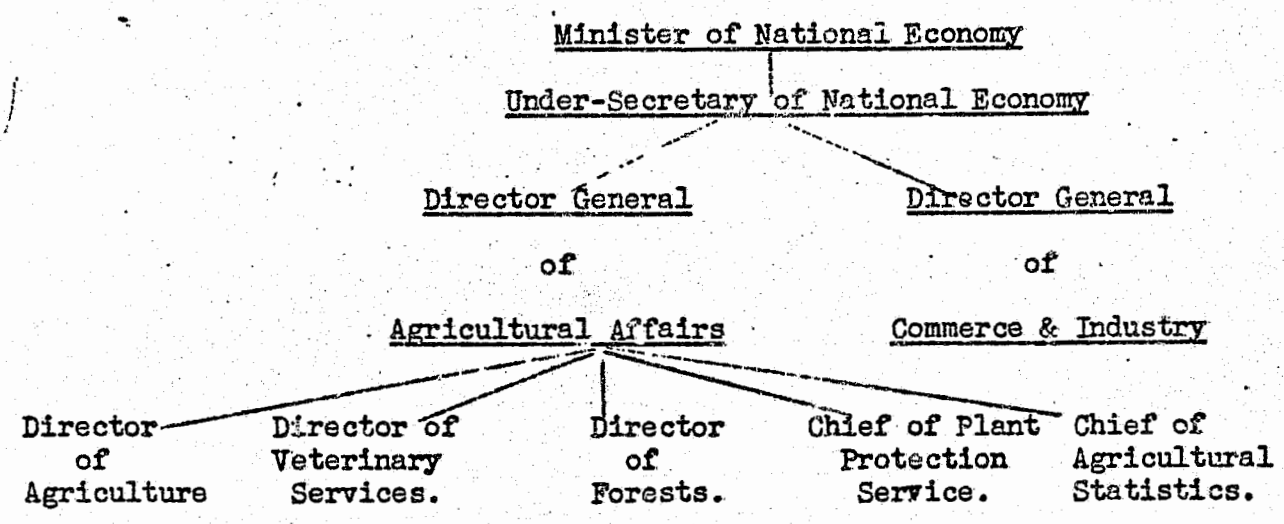
NOT RECEIVED

III.

THE AGRICULTURAL DEPARTMENT.

A. Organisation

There is no separate Ministry of Agriculture in Syria. The Department of Agriculture functions under the Ministry of National Economy. The organization of the agricultural aspect of this Ministry is as follows:-


Minister of National Economy
Under-Secretary of National Economy
Director General of Agricultural Affairs
Director General of Commerce & Industry
Director of Agriculture
Director of Veterinary Services.
Director of Forests.
Chief of Plant Protection Service.
Chief of Agricultural Statistics.

It will be observed that between the Director of Agriculture, as also the heads of sister departments, and the Minister there are two connecting links, a Director General and an Under-Secretary. The fact that cases appear to pass up through so many channels before they reach the Minister might be considered at first sight to be not conductive of speedy despatch, but it is understood that the Under-Secretary is concerned only with National Economy and that in actual working the Director has direct access to his Minister when necessary. It is understood that the powers possessed by the Director, as well as by the Director-General and Under-Secretary, are very limited and that most matters, however small, have to be referred to the Minister personally for orders or sanction.

The internal organisation of the work of the Department of Agriculture does not follow exactly the lay-outs of Education, Research and Extension Services, most usually adopted elsewhere.

The Syrian pattern is:

Director of Agriculture

Education and Extension	Plant Improvement and Technical Studies	Agricultural Stations.

B. Directions

The present Director of Agriculture is Amin Nasif Bey. He received his initial agricultural education and training partly at the Taneel Agricultural School (now the Jesuit Farm) near Chtaura in Lebanon and partly at the Selemiyeh Agricultural School in Syria, after the former school had been closed. The completion of this first stage in his technical education was followed by 6 months in Egypt where he was trained in plant nursery work. He then went for four years to the Ecole Nationale d'Agriculture de Montpelier, France, from which he graduated in 1926. Since then he had been successively, teacher in Selemiyeh Agricultural School for three years, Chief of the Plant Protection Service for 10 years, Officiating Director of Agriculture, Commerce and Forests from 1939 to 1945 and Director of Agriculture since the latter year. He thus has been in charge of the agriculture of the country for the past nine years.

C. Education

Agricultural education in Syria is entirely in the hands of the Agricultural Department. There is no Faculty of Agriculture in the University nor has elementary agriculture or rural science yet been introduced by the Education Department into elementary schools. It is modelled generally on the French "Ecole pratique" which is an intermediate type of agricultural education between the "Ecole farms" and higher education of degree status.

Instruction in agriculture is being given at present at three centres in Syria. They are:

1. The Agricultural School, Selemiyeh (Hama district)
2. The Agricultural School, Mouslimiyeh (Aleppo district)
3. The Bouka Agricultural School (Latakia district).

The construction of the buildings for another Agricultural School at Hosh Kharabo (Damascus district) is well advanced and it will begin to function within the next few months. Plans are under consideration for opening additional schools in other districts of the Republic.

(a) Selemiyeh Agricultural School.

This is by far the oldest of all the Agricultural Schools in Syria - it was, in fact, the only centre of agricultural education till very recent years. Its curriculum and general course of training have been

taken as the model on which the other two schools have been set up and on which still others may possibly be founded later. A description of the education which it affords is, therefore, of interest.

Past History

Selemiyeh is located about 20 miles S.E. of Hama, the nearest town. Its staff and students have few local amenities. The School was founded by the Turks originally about 1905 as an elementary agricultural school for training farmers' sons who would return to the land. In 1919 after the Great War the school was reorganised by the Syrian Government on the lines of the French "Ecole pratique" and it continued thus till 1931. It is understood that the senior teaching staff during this period of 12 years were men who had received their agricultural education in France.

In 1931 to 1946 Selemiyeh again functioned as an elementary agricultural school for boys who intended to return to the land. They were not considered to be qualified for departmental service. The course was of two years' duration and about 25 boys were admitted annually. Entrance age was 15 years and above. Education, board and lodging were provided free by the Syrian Government.

Present Course

The type of education given up to 1946 was not considered to be sufficiently high and, accordingly, the course was reorganised in 1946-1947 at its present level.

Duration

The course is now of four years' duration. Agriculture does not find a place in the subjects taught during the first year, which is regarded as preliminary only and as leading up to the proper course during the three subsequent years.

Entrance standard

The age for admission is 15-20 years. A certificate of elementary education (5 years' study) is required for entrance. Students are admitted by competitive examination. The number of applicants annually is said to be about 40 to 30 places. Since the standard of education in the towns is higher than that in rural areas, and in order to give each area a fair chance and to prevent too many urban students from securing admission, each of the nine districts in the country receives a quota of seats to be filled and applicants compete amongst those from their own district only.

Fees

To Syrian nationals education, board and maintenance are given free. For non-Syrian students a fee of L.S. 300 (about 34 Sterling) a year is prescribed.

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Vacancies for non-Syrians

There is no actual reservation of places for outsiders but it is understood that the school is prepared to admit a limited number of boys from neighbouring countries.

Present number of students

There are 27 boys in the 1st, 15 in the IInd and 26 in the IIIrd year. There is not yet a IVth year class as the present four-year course was reorganized only in 1946.

Subjects taught

The prospectus and syllabus of the present course have not been printed so far, but the following details were given by the Principal:

	Subject	Years in which studied			
		I.	II.	III.	IV.
1.	Arabic language	x	x	-	-
2.	English language	x	x	x	-
3.	History	x	-	-	-
4.	Mathematics	x	-	-	-
5.	Geometry	x	x	-	-
6.	Physics & Meterology	x	x	x	-
7.	Chemistry & Agricultural Chemistry	x	x	x	x
8.	Zoology	x	x	-	-
9.	Botany	x	x	-	-
10.	Geography and Economic Geography	-	x	-	-
11.	Algebra	-	x	-	-
12.	Geology	-	x	-	-
13.	General Sociology	-	x	-	-
14.	Agronomy	-	x	-	-
15.	Poultry keeping	-	x	-	-
16.	Topography	-	-	x	-
17.	Hygiene	-	-	x	-
18.	Economics and Agricultural Economics	-	-	x	-
19.	Bee keeping and silk rearing	-	-	x	-
20.	Horticulture (vegetables)	-	-	x	-
21.	Horticulture (fruit)	-	-	x	x
22.	Field crops	-	-	x	x
23.	Agricultural Industries and Dairying	-	-	x	x
24.	Animal Husbandry	-	-	x	x
25.	Agricultural machinery	-	-	x	x
26.	Insect pests	-	-	x	x
27.	Farm accounts	-	-	-	x
28.	Farm Management	-	-	-	x
29.	Rural legislation	-	-	-	x
30.	Forestry & Floriculture	-	-	-	x
31.	Plant diseases	-	-	-	x

Total lectures weekly in hours

(a)	First half of each year	21	23	22	16
(b)	Second " " " "	21	21	22	15

Practical Agriculture

No separate area on the farm attached to the school has been set aside for training students. Each day the Principal assigns a number of students for practical work to each main practical operation in progress on the general farm on that day, e.g., tractor ploughing, harvesting, pest control, nursery work, etc.

Each student does 3½ hours practical work of this nature daily on four days a week. The ordinary farm staff supervises the work of the students: there is no supervision by the senior teaching staff.

Staff. The staff of the school consists of -

(a) a principal and an assistant principal.
(b) 3 Egyptian teachers
(c) 1 part-time local teacher.

The Principal was trained at Selemiyeh from which he passed out in 1924. In the interval he has been successively Agricultural Controller, Agricultural Engineer and, since 1946, Principal. He teaches topography and is in charge of the practical agriculture.

The Assistant Principal is also a Selemiyeh product of 1929. He worked in Transjordan for 5 years; then was in charge of nursery work at Selemiyeh; then held a scholarship in Animal Husbandry at the Fuad I University, Cairo, 1944-1946. Since his return he teaches Animal Husbandry.

The 3 Egyptian teachers are graduates in agriculture of Cairo University. They are employed on contract and have been at Selemiyeh for two years. They teach agriculture and all the connected sciences - chemistry, physics, botany, zoology, entomology, plant pathology, horticulture, hygiene, geology. Each receives a salary of L.S.400 (about 45 Stg.) a month, together with free board and lodging. All live in the school: if they were to live outside they would receive an additional L.S.50 a month. The part time local teacher comes from the ordinary village school at Selemiyeh. He teaches mathematics, geometry and economics.

The staff includes, in addition, 2 supervisors who are responsible for the general welfare of the students. One of them teaches English and Arabic; the other takes history and geography.

Facilities and equipment. Attached to the school there is a farm of about 250 acres, of which roughly 160 are under cultivation, 33 under fruit, 10 under forests, and the remainder under buildings, roads, canals, etc.

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Of the 250 acres about 50 acres are rainfed; the remaining cultivated area is irrigated from kanats. The farm is given over to general crop and fruit cultivation and nursery work. As already stated no part of it is specially earmarked for students' practical training.

Hitherto the school has been poorly equipped for the teaching of science subjects. There are no laboratories for practical work, and there is no apparatus other than a few models to illustrate certain phases of plant life and the structure of certain parts of the animal body. There is also a small stock of glassware for laboratory purposes but no suitable means of using it profitably.

A medical dispensary is stocked with medicines and two beds. There is no resident medical staff; the local doctor at Selemiyeh attends the school when called. It is understood that some one on the spot can do simple dressings.

A library room contains books on agriculture, printed in Arabic, French and English. The fullest use cannot be made of those in English as it is understood that only the Egyptian staff can read them.

There are facilities for football, basket ball, volley ball and some indoor games.

Electric light is generated on the spot and functions only till 10 p.m. daily. Water is pumped to a high-level tower for pressure purposes. There is no gas.

Buildings.

(a) Old. One main building provides a class room on the ground floor and dormitories on the upper story. Kitchens, dining rooms, etc. exist generally.

(b) New. Former barns and sheds are in course of conversion which should be completed within a few months. When finished there will be the following additional provision:

1. A chemical laboratory
2. A botanical laboratory
3. A second dormitory above these laboratories
4. A large hall for school gatherings and meetings
5. Lavatories and shower baths.

It is proposed at this stage only to describe the nature and quality of the agricultural education at present provided. Such suggestions as are put forward in regard to the future are made in a subsequent chapter.

(b) Mouslimiyeh Agricultural School

Mouslimiyeh is a village and railway station in the heart of the country roughly about 15 kilometres (10 miles) north-east of Aleppo.

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Buildings The buildings of the school are extensive and viewed from a distance, their setting and red roofs are attractive. The main provision consists of two double-storied buildings.

(a) One building has for ground-floor accommodation two class rooms. One of them is very large and contains specimens of seeds, charts of plants, specimens of forest timbers and some laboratory glassware. It has no benches of facilities for laboratory instruction, and is the only room for practical instruction which the school possesses. The top storey is used as a dormitory.

(b) The ground floor of the second building is mainly a large dining hall for students: there are some adjoining small rooms. The top storey will be used in due course as a dormitory when the III and IV year classes begin to function.

Farmyard accommodation here is better than at the other schools. It includes a large shed in one part of which there is a forge and smithy. The other and larger part has a glass roof and could be made to serve a very useful function in connection with the practical training of students. There are, in addition, a large cowshed, stallion stable, an implement shed and various small buildings for laundry, washrooms and other purposes.

The livestock on the farm consists of 6 bullocks and 7 milch cows. Machinery includes a very old Deering tractor, still capable of work, an old Gass threshing mill, a power seed drill, a hay rake and a self delivery reaper.

Land. Attached to the school is a farm of 190 acres. It is hilly land, some of it rough and in need of a good deal of attention to bring it into good condition. 90 acres of the total are devoted to field crops and an equal area to fruits, vegetables and nurseries. Of the 75 acres under fruit, more than four-fifths consists of a permanent orchard of grapevines and olives. Citrus, peaches and apples make up the remainder.

The facilities for irrigation are small, and in any case the hilly nature of the land makes it unsuitable for irrigated farming. Three small electric-driven pumps and a Windmill deliver water into concrete tanks at different points on the farm and from the tanks it is led off to the fields. The water table is at varying depths according to the slope of the land. At one wall it is about 10 feet from ground surface and at another about 50 feet. The domestic water supply is piped from Latakia town. An elevated tower to which water is pumped gives the necessary pressure in the taps.

Rainfall in this locality is 800-900 mms. a year. In the current year it was 840 mms. (about 24 inches). It is all received from September to April annually.

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As with the other school farms, part of the area of this farm is to be devoted to nursery work and part to field agronomical experiments.

(d) Agricultural School, Hosh Kharabo, Damascus.

150 acres of land were acquired two years ago at Hosh Kharabo, about 17 kilometres east of Damascus. This area is to serve the requirements of an Agricultural School, an Agricultural Station and a large nursery. The main school building is in process of erection and is expected to be ready for occupation before the end of the current year. Most of the details of the course of instruction to be given here have still to be worked out, but, according to present expectations, the standard of education for admission to this school will be somewhat higher than for the existing three schools. Instruction may also be at a higher level. It is envisaged that students who pass out in the First Division should be encouraged to proceed to foreign countries for further study. The School will probably admit 30-50 students annually.

Higher Agricultural Education

As already stated, Syria has no internal facilities for imparting an agricultural education of degree, or diploma approaching degree, standard. It relies, therefore, for higher education on sending selected students to outside countries where such provision exists. At present 14 students holding Government scholarships are pursuing courses of agricultural study as follows:

3 students in Belgium are studying general agriculture. The course is apparently very similar to that which some members of the staff of the Agricultural Department have taken in past years at one or other institution in France.

11 students are taking the degree course in Egyptian institutions; 2 of them at the Fouad I University, Cairo, and 9 at the Higher School of Agriculture, Shebin el Eom.

The lack of an adequate knowledge of the English language amongst students and departmental staff is a severe handicap in the acquisition of foreign training and in maintaining touch with progress in the agricultural sciences abroad. At present such training has to be restricted in the main to Arabic and French speaking countries.

D. Research.

In Syria agricultural research is the function of the Plant Improvement and Technical Studies branch of the Department. This branch is sub-divided into the following sections:

1. Field crops
2. Horticulture (fruit)
3. Horticulture (vegetables)
4. Plant pathology
5. Entomology
6. Beekeeping and poultry.

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Research is the basis of all agricultural improvement and without it real progress not only is retarded but is largely impossible of attainment. Syria is essentially an agricultural country and in the improvement and development of its agricultural industry lies the principal hope of its economic progress in the future. It is disappointing, therefore, that its Agricultural Department is neither suitably staffed nor adequately equipped for serious research.

Not one of the six sections already enumerated has a permanent head who is scientifically qualified to undertake the investigation of the many important problems on whose successful solution the future sound agricultural development of the country rests so largely. Three of the sections have no heads at all.

The Department possesses no research buildings and has no laboratories other than the chemical laboratory, consisting of one main room, one small room and some offices, which is located in a departmental nursery in Damascus. No true research is undertaken in it; activities are concerned with routine chemical analyses of soils, water and farm produce for the Department, and with occasional work for other Departments. The staff consists of one chemical engineer, who has trained in Caen, France. He has no technically trained assistants.

In this generally negative situation, however, it is encouraging to find that during the last two years Syria has taken steps to initiate research on certain aspects of field crops, fruits and vegetables by engaging on two-year contracts an experienced and senior agronomist and a similar horticulturist, both Americans. An Animal Husbandry officer, also recruited from America, has returned to the U.S.A. recently on completion of his one year's contract.

Mr. Bracken, the Agronomist, whose contract is now approaching an end, has done valuable work in the short period he has been in Syria. He has made a beginning in agronomic investigation by laying out trials designed, according to the latest scientific methods, to determine the crops and crop varieties best adapted to the different cultivated tracts in the country, the fertiliser needs of Syrian soils in relation to those crops, the tillage practices most suited to the various soils, crop rotations of varying duration suitable for the different conditions. The main experiments cover wheat, barley, sugarbeet, millets, maize, rice, cotton, linseed, soyabean, potatoes, tobacco, tomatoes

Mr. Pickett, the Horticulturist, has taken corresponding action in relation to fruits and vegetables. Since newly planted fruit trees take some years to reach maturity and full bearing, the results of the work on fruit are less apparent yet than are those on annual field crops, but sound planning appears to have been done and in due course valuable knowledge and data should result. More obvious is the work on vegetable crops and results in this sphere will accrue more rapidly.

Since views are expressed in another chapter of this note on the research requirements of Syria, it will suffice to say here that the present valuable work of these foreign specialists is no more than an introduction to agronomic and horticultural research. Apart from the need for inaugurating long-term research on the botanical, chemical and other aspects of

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the country's industry on which investigation has not yet begun, it is imperative to the future economic progress of the republic that the agronomic and horticultural research now initiated should be continued under competent scientific officers when the services of those now engaged on it come to an end.

E. Agricultural Stations

In point of number and distribution on its farms the Agricultural Department is perhaps better provided with facilities for field work than for most other activities, since it controls 12 stations located in eight districts (mahafazats). Jebel Druze is the only district unprovided with a station of any sort. Damascus, Hama, Aleppo and Latakia districts have two stations each: Horan, Homs, Euphrates and Jezireh districts have one each. Six of these departmental centres have been started within the last two or three years. Some others have been enlarged during the same period. Some general particulars are as follows:-

Location of Station	Whether Old or New	Area in acres	Whether Irrigated (I) or Rainfed (R)	Purpose for which used: Field Experiments (E) Nursery (N) School (S)		
Damascus	Old	15	I		N	
Hosh Kharabo	New	150	I	E.	N.	S.
Ezraa	New	250	R	E.	N.	
Homs	Old	110	I	E.	N.	
Hama	New	115	I. & R.	E.	N.	
Merj de Creme	Old	750	I. & R.	E.	N.	
Selemiyeh	Old	250	I.	E.	N.	S.
Mouslimiyeh	New	250	R.	E.	N.	S.
Aleppo	Old	75	I.	E.	N.	
Deir ez Zor	Old	75	I.	E.	N.	
Hassetche	New	62	I.	E.	N.	
Bouka	New	190	R.	E.	N.	S.
Latakia	Old	10	I.	E.	N.	

The production of nursery plants of fruit and ornamental trees and shrubs has constituted the principal use to which the older departments centres have been devoted hitherto. Great importance has been and still is attached to this departmental activity. Fruit nursery plants are sold to the public at cheap rates: ornamental plants - or some of them - are distributed free of charge. In 1947 the number of plants issued by the Department was approximately:

Grafted plants	59,000
Non-grafted plants	200,000

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These figures do not include eucalyptus seedlings which were distributed free. In 1948 an increase of 50% on these numbers is contemplated. In the stations which have opened recently similar stress is being put on nursery work and a considerable proportion of the area of each is being devoted to it.

The sites of the majority of the new stations have been very well chosen. They are located in prominent positions where their activities will be well in the public eye, and the land is suitable for experimental purposes. Since, however, a considerable area of each station is to be devoted to nurseries, it seems probable that the area available for field investigation may well prove inadequate later when such experiments attain the scope and magnitude which their importance necesssitates.

F. Extension Services

The activities which fall under this branch of departmental work appear to follow the usual pattern of improved seed distribution, fertiliser distribution, field demonstration, pest and disease control, etc. A travelling cinema has been obtained recently from America but has not yet been put in use pending the arrival of films for exhibition by it.

The staff employed on extension work is provided on the broad general basis of one Agricultural Engineer for each district and one Agricultural Controller for a sub-district or group of sub-districts. At present Damascus, Horan, Homs, Hama, Latakia have an Agricultural Engineer each; Euphrates and Jezireh share one such officer but he has an assistant; Aleppo has a local Director of higher status; Jebel Druze has an Agricultural Officer with no technical qualification. For the 41 sub-districts of the Republic there are 18 Agricultural Controllers. The 6 sub-districts of Damascus have 5; for the 8 subdistricts of Latakia there are 4; the 12 subdistricts of Aleppo have 4. Homs has no sub-districts. In addition, each of the districts of Damascus, Aleppo and Euphrates-cum-Jezireh has one plant protection officer.

With two exceptions all the extension staff are locally strained. The majority received their technical education at the Selemiyeh Agricultural School; 6 took the two years' course at the American University, Beirut, and three are products of an elementary farm school at Latakia. The exceptions are the Director of Aleppo and the Agricultural Engineer of Euphrates-cum-Jezireh who are graduates of Montpelier, France. All the remaining Agricultural Engineers are from Selemiyeh originally: they have attained their present status through long years of service, rather than by reason of superior training.

The Agricultural Engineers are equipped with jeeps for touring purposes. Agricultural Controllers have to find their own transport.

G. Finance

The Budget provision for the Agricultural Department includes also that for veterinary and forestry activities. Sufficient details are not available to enable the expenditure on agriculture alone to be

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determined, but it has been suggested that it might represent two-thirds of the whole.

The following figures show the provision and distribution made in the 1948 budget for agriculture, veterinary and forestry combined:

			L.S.	(L.Stg.)
1.	Personnel		1,330,000	(151,000)
2.	Travelling and subsistence allowance, office equipment, fuel, light, water rents, telephones, etc.		445,500	(50,700)
3.	Construction, repair and maintenance of buildings, purchase of land.		1,361,300	(154,500)
4.	Labour for agricultural stations and for collection of Sunni Pest insects	664,000		
	Purchase and upkeep of animals	95,000		
	Equipment for agricultural stations and for control of pests and of animal diseases. Purchase of improved seeds. Expenditure on locust control (L.S. 450,000)	809,000	1,569,700	(178,100)
5.	Extension services, exhibitions, Expenses of economic studies. Share of cost of International Locust Control (L.S.46,800). Subscription to certain International Bodies.		248,220	(28,100)
6.	Department of State Domain		47,880	(5,400)
7.	Damascus Agricultural School (3 months only)	13,692		
8.	Three Agricultural Schools at Selemiyeh, Mouslimiyeh, and Bouka (personnel only)	176,278		
	General expenses on all schools	319,932	631,402	(71,700)
9.	Provision for two new Agricultural Schools. (Deir ez Zor L.S. 54,000; Jezireh L.S. 67,500)	121,500		
10.	Foreign trading salaries (connected with imports and exports).		45,000	(5,100)
		L.S.	5,679,002	(644,600)

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Owing to the manner in which the budget is framed, it is difficult to determine, or even to estimate, the expenditure on particular services and especially on the three main heads, education research and extension work. The following general observations are made:

1. The total budget provision in 1948 for the Republic of Syria is L.S. 127,909,000 (14,519,000 Stg.) Hence agriculture, veterinary and forestry combined received 4.44% of the whole.

2. If the estimate that agriculture accounts for two-thirds of the combined amount is reasonable, then the provision for agriculture may be approximately 3% of the Syrian budget, or 430,000 Stg. a year.

3. In comparison with £664,600 Stg. for agriculture, veterinary and forestry, the allotment for education is L.S. 20,459,000 (2,322,247 Sterling).

4. The salaries of personnel, their subsistence and travelling allowances and office amenities account for an expenditure of 201,700 Stg. or 31% of the whole departmental provision.

5. Labour for agricultural stations and collection of "Sunni" insects costs the equivalent of 75,300 Stg. and represents 11.6% of the whole budget.

6. 28,200 sterling allotted to extension services, exhibitions, economic studies and subscriptions to International bodies constitute 4.4% of the departmental budget provision.

7. The funds of 71,700 sterling provided for Agricultural Schools represent 11% of the budget. This sum, however, includes 31,800 Stg. for two new schools in the Euphrates and Jezireh districts which are not likely to materialise in the current year.

8. The personnel of the three existing agricultural schools at Selemiyeh, Mouslimiyeh and Bouka accounts for 20,000 stg. a year. It is difficult to estimate how much of the provision of 36,300 stg. made for the general expenses of all schools is debitable to these three active institutions. Possibly 20,000 stg. may not be excessive. In that case the total cost of the agricultural education given at them may be of the order of 40,000 stg. a year.

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IV.

SOME INDUSTRIES RELATED TO AGRICULTURE.

1. Fruit and Vegetable Preservation

A limited liability Company, known as Societe de Conserves et d'industries agricoles, was started in Damascus in 1932. The nominal capital is L.S. 450,000 but the actual capital is said to be L.S. 1,700,000. Shares number 22,500. Their value has fallen from L.S. 160 each last year to L.S. 65 in the current year, due, it is said, to inability to work anything approximating capacity or to compete with products of outside countries owing to the high cost of production locally.

Management. The Manager also fulfills the function of technical expert. After taking the four years' course at the Agricultural School at Selemiyeh he spent three years at the Ecole nationale d'industrie agricole at Douay (Northern France) in studying sugar refining, brewing and fruit preservation. He then worked under a German expert who was employed by the Societe during 1934-36, and, after acquiring the necessary experience, succeeded him in his present capacity. His single assistance also did the Selemiyeh course.

Equipment. The factory has spacious buildings and a considerable amount of equipment such as steamers, pressure cookers, sterilisers, pea sheller and grader, etc., etc. It has six very good underground cold stores which are extensive in size and capable of accommodating large stocks of products. Only two were in operation at the time the factory was visited.

The factory makes its own tin containers. It imports sheet tin-plate from England, cuts and makes it up into tins of different sizes. It is equipped with all the necessary tin-making and sealing machinery. Difficulty is experienced in securing supplies of tin plate and the management would welcome any assistance that might be possible in overcoming it. Present annual requirements are said to be 500 cases of 100 kilos per case, each case having 112 sheets and weighing 2½ lbs. Size of sheet 28" x 20". The quality is known as "Primcok".

Capacity. The maximum daily capacity of the factory was stated to be 14,000 tins of one kilo each, whether fruit or vegetable. At present the factory is running at only 25 - 30% of that capacity because of difficulties which are being experienced and of costs, particularly the high price of sugar. To enable it to work to full capacity, the principal requirements are:

1. Sugar at cheaper rates. Sugar now is obtained from Java, Egypt, or Czechoslovakia. Its pre-war price was stated to be 8 Syrian piastres a kilo and to-day's price 110 piastres (2/6d. stg) a kilo. (It was said that the actual cost of the sugar including freight and customs, is 60 piastres only, but that the Syrian Government have subjected it to an additional tax of 60 piastres a kilo, thus almost doubling the imported cost).

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2. A good tin-plate supply. The present price of a tin is 15 Syrian piastres (about 4 pence) against a pre-war cost of 3 piastres. Price in this connection, however, matters much less than that of sugar.

Manufactured products

The chief product which the Company manufactures is apricot "pulp". Actually this "pulp" is the half fruit such as one buys in tins of preserved apricots; it is not crushed apricots. The pulp is canned in 5-kilo sealed tins and sterilised. No sugar is added. There is a heavy demand for the Damascus local variety known as "Belladi".

Of the 1180 tons of apricots which the Company manufactures annually 70% is pulped and exported. 30% is made into jam and sold locally.

Pre-war export markets in order of importance were Belgium, England, France and Switzerland. At present the order is England, Holland, Sweden and Belgium. The pulp is exported in two forms:

1. In case of 6 tins (30 kilos): sterilised; Price 3 stg. C.I.F.

2. In wooden barrels of 200 kilos each: product not sterilised but 802 added as preservative. Price 24 stg. C.I.F.

Other products prepared by the firm are said to be:

Canned tomatoes	400	tons a year
Peas	120	-do-
Pickles	100	-do-
Canned fruit (other than apricots).	100	-do-

Total canned vegetables - artichoke, spinach, beans, ochra, carrots, onions - about 150 tons at the rate of 10000 - 15000 tins of each vegetable.

Quality of raw products.

The management states that the quality of some varieties of vegetables requires improvement in order to make them suitable for canning. The Agricultural Department is understood to be collaborating with the firm in making improvements in this kind.

Other Preserve Companies

Two other privately owned concerns in Damascus are understood to be preserving fruit. Both are said to work on a much smaller scale than the Societe just described. One of them is believed to have exported some of its products before the war but does not do so now.

2. Sugar Manufacture.

A limited liability Company with headquarters in Damascus has been formed for the manufacture of sugar. A factory to produce sugar from

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sugar beet is in course of erection at Homs and its completion is expected before the end of the current year. Initially this factory will draw its raw products from both the Homs area of Syria and Beqaa in Lebanon. Later on, if circumstances warrant, a second factory may be erected in Beqaa.

The Company employs an industrial specialist from Czechoslovakia - before the war there were two - while a former Director of Agriculture acts as its technical adviser.

The growing of sugar beet in Syria is a new venture but local opinion considers it to be sound in the light of experiments which have been and are still being made on the sugar beet crop. The Agricultural Department and the Company cooperate in these experiments. The results have led the Department to consider that under ordinary irrigated cultivation conditions, yields of 15-20 tons per hectare (6-8 tons per acre) of sugar beet will be obtained. The curose content of 16 varieties of sugar beet under experiment last year averaged 17.3% with a minimum of 15.0% and a maximum of 19.38%.

It is expected that this factory when in full production will be capable of supplying from one-quarter to one-third of Syria's sugar requirements. It will probably take a little time, however, to work up to capacity. Syrian cultivators have no experience of sugar beet growing or knowledge of its possibilities, financial and otherwise, compared with the crops usually grown. They will have to be interested in growing this new crop and taught how to grow it. The crop rotation to be adopted has also to be worked out and in this connection various oilseed crops, such as groundnuts, soyabean, sunflower, etc. may prove suitable for rotating with sugarbeet, thereby developing the accepted policy to produce vegetable fats and thus release olive oil for export.

The Company has imported ten tons of sugarbeet from Czechoslovakia for distribution to cultivators, and a beginning is to be made this year in growing the crop.

It is understood that sugar beet has been preferred to sugarcane as local conditions in this area are more suitable for it. The possibility is said to be envisaged of setting up later a sugar factory in the Euphrates district where sugarcane would constitute the raw product.

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V.

SOME FUTURE POSSIBILITIES AND NEEDS

Since the whole economy of Syria, like that of most Middle East countries, is inextricably bound up with its agriculture, its future prosperity and its ability to raise the standard of living of its people depend largely on the possibilities of development which its agriculture offers and on their maximum exploitation. A tour of the country, such as has just been made, though short in point of time, is sufficient to convince the technical visitor beyond all doubt that the potential for development and improvement definitely exists. Only the will to develop the careful planning of the most suitable lines to adopt, the allotment of the required funds and the provision and wise use of all the appropriate tools are needed. Given these requisites, agricultural production can be vastly improved; existing internal industries can be expanded and new ones developed and exports of commodities of which the world stands in much need today can become a permanent feature of Syria's economy. These developments in their turn will bring to the country increased financial prosperity and will ensure to the people better education, better health, better social conditions and amenities. Thus, agricultural improvement is the keystone in the development of the country and merits, even demands, priority in planning, finance and execution.

From the data which have been given and the conditions which have been described in previous chapters, it is obvious that the nature of the shortcomings in Syria's agriculture differs little, if at all, from those of many other Eastern countries and that the appropriate remedies will follow the same general pattern. Such views as are expressed in the pages which follow derive, therefore, from observations made and experience gained in the East over many years and under conditions of climate, soil, cultivation practices and standards and people not vastly differing from, and often completely resembling, those existing in Syria. This similarity ensures that Syria can benefit enormously by adopting measures comparable with those already introduced in some, and in process of introduction in others, of those countries.

The two bread lines on which agricultural production in Syria, as in other similarly situated countries, can be increased are already well known. They are:-

1. The more efficient use of the land at present under cultivation;

2. The extension of cultivation to land at present waste but cultivable.

Syrian conditions offer very considerable scope in both these directions.

MORE EFFICIENT USE OF CULTIVATED LAND

In the East the chief ways by which production can be increased on land already under cultivation are any or all of the following:

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(a) The greater use of irrigation.
(b) The more extensive use of manures and fertilisers.
(c) The improvement of cultivation practices.
(d) The use of better varieties of seed.
(e) The protection of crops from pests and diseases.

Irrigation.

Of all the benefits which can be conferred by a Government on cultivators in Eastern countries, where the rainfall is scanty, precarious and seasonal and the climate hot, none can compare in lasting effect with the development of irrigation resources. Under such climatic conditions a permanent irrigation supply assures the cultivator of a crop, whatever the vagaries or the inadequacies of the local rainfall, permits the growing of a larger range of crops and of more highly paying crops, increases the intensity of permissible cropping, brings prosperity not only to the individual cultivator but to the community at large, to trade and to industry and makes a large contribution to the prosperity of the country.

Syria has done little until recent years to develop and utilise its water resources for the advancement of its agriculture. That it is now alive to the advantages of a development policy of this nature is evident from the major irrigation works which have been undertaken in the last few years. These works, however, only touch the fringe of existing possibilities. Much larger schemes appear to be feasible. At present valuable life-giving water is being allowed to flow unutilised down various rivers to the sea when it could be harnessed and turned to the great economic advantage of the country. Major irrigation projects cannot be constructed without adequate finances and these may not always be readily available in the Government coffers, but it is suggested that there are few investments that are more profitable and few in which resort to temporary borrowing is more justified, than sound irrigation development.

According to existing statistics some 700,000 acres of land in Syria are irrigated at present and 80% of that area derives its water from rivers. One authority has estimated that if full use were made of all river supplies irrigated cultivation could be raised to 1½ million acres annually. Whether that estimate is reasonable can only be determined by detailed surveys of river supplies and the investigation of the suitability of adjoining areas for their utilisation. That the possibilities are very considerable is obvious to the mere layman.

The possibilities of a large irrigation scheme on Syria's largest river, the Euphrates, appear to be limited by the nature of the country along its banks, since its flows in a depression over much of its length and direct command of the land by gravity flow cannot be obtained on any great scale. Its extensive use also may not be free of international complications. It is understood that, at one point at least, the construction of a storage barrage is possible but that the cost of conveying the stored water to areas suitable for its use might be uneconomical.

If so, it would seem that developments towards the greater use of Euphrates water may have to be confined largely to an expansion of

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irrigation by pumps, noriahs and other forms of mechanical lift. If the production of cheap hydro-electric power on this river is feasible it might be possible to utilise it for lifting river water to the high lands of the surrounding country.

Such considerations and difficulties do not appear, however, to enter into the efficient use of the waters of the River Khabour which may, indeed, be the best of all Syrian rivers on which to develop irrigation projects. According to one engineer with whom the matter was discussed there are said to be four distinct possibilities on this river. These were given as:

(a) Four canals taking off the river at two points between Ras-el-Ain and Hassetche. (One of these canals - at Tell Maghass - has already been partially constructed and described earlier in these notes). The estimated area of land which these canals would irrigate was stated to exceed 80,000 acres.

(b) A project would cater for 30,000 acres if a barrage were constructed across the river at Salseem South of the Hassetche.

(c) A barrage across the river at Tafl would provide irrigation supplies for 50,000 acres of land between Tafl and Fadrhami. It is understood that a scheme is afoot to set up a corporation to develop such a scheme if suitable terms and conditions can be arranged with the Syrian Government.

(d) The largest possibility of all is said to lie in the construction of a 4000 metres dam and reservoir about Markadas. The area for which this scheme could cater was given at 110,000 acres.

How far any or all of these schemes are feasible, whether the river supplies are adequate to cater for all of them simultaneously or only suffice for some of them, and the exact areas for which they can provide irrigation most profitably, must obviously be determined by detailed surveys of different kinds, but it is clear that the River Khabour has potentials for irrigation purposes which it is in the national interest to develop.

Elsewhere, too, there are smaller rivers whose waters could be utilised profitably, both for increasing production on adjoining lands already under cultivation and for bringing land now desert under arable farming. All such possibilities should be thoroughly surveyed at the earliest moment, if such action has not been taken hitherto, and those which are economical should be financed and executed with the minimum delay.

Drainage can also play a part in increasing production in special areas such as the Ghab Valley on the River Orontes.

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It goes without saying that where major flow irrigation schemes are not feasible, the maximum development of lift irrigation should be undertaken. So far as is known the possibilities of irrigation from the subsoil by means of tube wells has not yet been examined in Syria. It is possible that there may be areas where adequate supplies of underground water exist, and that they could be lifted economically, particularly for intensive highly paying crops, such as tobacco, sugarcane, vegetables, fruit, especially if cheap hydro-electric power should become available.

Manure and fertilisers

Farmyard manure finds little place in crop production in Syria. Its main use is as fuel, and, unless oil in some form can be introduced for domestic fuel purposes, there seems little prospect in the diversion of farmyard manure to the land. Since most of the country is entirely treeless wood fuel is unobtainable. For crop improvement, therefore, Syria must rely largely on chemical fertilisers and green manure crops.

Present knowledge of the economics of the use of these aids to production under Syrian conditions is altogether inadequate. There is little doubt that the use of some kinds of fertilisers, particularly nitrogenous, will increase production profitably under irrigated farming, and possibly also in the heavier rainfall areas, but their economies in areas of low rainfall will require careful examination, since the ultimate effect of these manures is closely linked with soil moisture.

Before sound recommendations can be made as to their use, therefore, a great deal of experimental investigation is necessary with each class of fertiliser under the different irrigated and rainfall conditions which maintain in the country. This applies to fruits and vegetables, as well as to the main farm crops. Until research has provided the necessary data the use of fertilisers must be somewhat arbitrary and it is essential that the experimental work recently begun should be expanded and developed in order to provide information in the minimum time.

Improved cultivation practices

In Syria, as elsewhere in the East, the wooden plough of biblical times is still the main, and almost the only implement of cultivation. Experience elsewhere also indicates that it would be unwise to condemn it outright under all circumstances. For instance, in north west India extensive experiments, conducted on clean alluvial soil, free of weeds, failed to prove that higher crop yields were obtained by substituting a modern bullock-drawn, furrow-turning iron plough, though the use of the latter reduced the number of necessary ploughings and so saved labour. Whether similar results would be obtained under some Syrian soil conditions requires examination. There is no doubt, however, that on some areas in Syria a more effective plough than the indigenous implement is needed. This is very noticeable in the north of the Jezireh where the country plough is unable to produce much effect on land carrying a heavy growth of weeds and grass. The economics of the use of modern implements of cultivation should be investigated under the various climatic and soil conditions. This automatically includes the use of seed drills

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and line sowing of crops in contrast to broadcast sowing. It also involves investigations on the optimum spacing of plants of the main crops in the row and between rows. The evolution of some very simple implements of cultivation suited to local conditions may increase yields and reduce labour in Syria, as they have already done further east under fairly similar conditions.

Crop rotations in Syria leave much room for improvement and in some tracts they are more noticeable by their absence than by their use. Little or no attempt is made over large areas at crop rotations, the cultivator apparently being content to follow a cereal crop by the same cereal year after year, or in alternate years, the land being fallowed in the interval. Such a practice is neither good for the soil nor profitable for the cultivator's pocket. It is essential first to work out and then to introduce into every-day agricultural practice sound rotations to suit the different soil, rainfall and irrigation conditions. This will give scope also for intensifying the production of some existing crops for home consumption and export and of introducing new crops for which Syria now depends for its requirements on imports from other countries. In particular, oilseeds, sugar and rice are visualised.

Improved Seed

Except for the introduction several years ago of two varieties of foreign wheat, one of which is now being grown on a fair scale, little appears to have been done in Syria till recently to provide varieties of the cereals, which occupy such an exclusive position in crop growing, better in respect either of higher yield or superior quality. So far as is known, nothing has been done in regard to other crops. The result cannot be other than steady deterioration, such as is said to be very marked to-day in regard to the quality of the locally-grown cotton crop. Recently small scale trials have been begun to test the suitability and yeild performance of a considerable number of varieties of different crops obtained from foreign countries. If success results from these investigations it may be possible to effect comparatively quick improvements in the yield and quality of some Syrian crops. The long term process of improvement by local selection and breeding is likely, however, to be unavoidable in other cases, and it requires good botanical staff which Syria does not possess at present.

In connection with wheat improvement it is suggested that seed of certain Punjab varieties be obtained from Pakistan. In particular, the varieties Punjab 8A, C 518 and C 591 should be tried. The last two are now the main varieties on the 10 million acres of wheat in that province. C.518 is best suited to rich land and on it no other wheat variety has produced comparable yields. Punjab 8A and C.591 are general purpose wheats which suit average conditions. The latter is the best quality wheat in the country; it obtains a premium over all other wheats in the local markets.

As a first step to provide part of Syria's own sugar requirements, sugarbeet is now being introduced. It is understood that sugarbeet is to be tried in certain areas as the next step. Here again it is suggested that Syria should not confine its search for good varieties to the

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West. India has produced varieties which are world-famous and it is suggested that a selection of the best Coimbators varieties be obtained and tried thoroughly. India and Pakistan may be able to offer possibilities in cotton varieties suited to Syrian conditions. * * * Though much shorter in staple length and lower in quality than the latter, several cottons now growing widely in the Indian sub-continent are of much higher grade than the present Syrian product.

When looking for improved varieties of crops, the general tendency in Middle East countries is to turn to the West. It is suggested that sometimes the East too has valuable materials to offer and that those sources also should be tapped.

Crop pests and diseases

The best of all control measures is that of growing varieties of crops preferably immune but at least highly resistant to attack by ordinary diseases. Unfortunately that ideal is usually difficult of attainment and recourse has to be had to preventive and control measures. Syria already has a serv'ce which deals with measures of this nature. It should be strengthened and improved. At the same time every endeavour should be made to find or produce crop varieties less susceptive to the main disease than some of those in cultivation at present.

CULTIVABLE WASTE LAND

According to statistics less than 5-3/4 million acres, or only one-eighth of the 46 million acres of land in Syria are cultivated at present. The same statistics show that a further 8½ million acres of land now waste are cultivable. Even if the latter figure be an over-optimistic estimate it is certain that there is very great scope for adding to the cultivated area of this country. The population, however, is small - less than three million people - and its capacity to break up new land and farm it on a small peasant system is limited. Nor could such a system be likely to obtain the maximum return from the soil. Initially, therefore, it will be preferable to concentrate major efforts on tracts which are suitable for mechanical cultivation and where the rainfall is adequate for crop production.

The Jezireh

Of all such areas the Jezireh offers the greatest scope. It has been estimated that in that tract at least a million more acres can be brought under the plough. As already noted, the greater part of that vast region is suited admirably for mechanical farming. Some parts, however, appear more suitable for fruit growing. Stock rearing should find scope in the north-east corner of the district.

As has been stated elsewhere, the road communications within and into the Jezireh are bad: they are even nonexistent over a large area, and the whole of the north of the district is unapproachable by road

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after heavy rain. The airfield now under construction at Kamichliye will assist in opening up the territory to the outside world, but full and proper development of the agricultural resources of the district can only be achieved if all-weather land communications, not only into but inside it, are adequately established. It is thus essential that not only the main road between Deir ez Zor, Hassetche and Kamishliye should be completed but that good metalled roads running east and west of Kamichliye to the boundaries of the district and other subsidiary roads be laid down as part of the initial scheme of developing this very promising area.

Other regions in which it appears that mechanised cultivation can be profitably intensified are the Akkar Plain in Latakia district and the Homa-Hama-Aleppo area.

TRACTORS.

Syria is now very tractor-minded and the development proposals of the Agricultural Department include a large increase in the number of tractors now operating in the country. So far most of the tractors in use in Syria are of American manufacture. So, too, are other machines such as combine-harvesters. Various factors appear to have produced a local preference hitherto for the American over the English product, such as short supply and difficulty of producing the latter, a liking for tractors of the caterpillar type over the wheel type and the negligible manufacture of the former in Great Britain. A tendency towards high-powered over medium-powered tractors has also contributed as British manufacture favours the medium and low powered type.

American tractors are difficult to obtain to-day in adequate numbers, partly because of their short supply and heavy world demand and partly because of dollar scarcity in many of the countries which require them. If tractors suitable to its needs and conditions were available in Great Britain there would be a market for them in Syria, as also in other Middle East countries.

A special study which has just been made of the tractor manufacturing position in Great Britain indicates that there are being manufactured in this country at present certain tractors which may meet some of the needs of Syria. These new tractors, of which little is known in the Middle East so far, are:-

1. The Fowler-Marshall. This tractor has been on the market only about three months. It has a diesel engine of about 40 H.P. and is of the single cylinder type. There are two models, one of the wheel type and the other a cater-pillar. It is expected that the manufacturers will be in a position to supply some hundred in the coming year.

2. Another new British tractor of the caterpillar type now on the market is the Bristol 20. The present model uses petrol or paraffin as fuel. The production of 1500 of these tractors a year is anticipated. In the current year it is expected to be 600 only. Export may begin in 6 months.

3. The Ferguson light tractor is now in use in large numbers in Great Britain and appears to be popular for certain classes of work suited to its low horse-power. It is a wheeled-machine with petrol engine.

Another tractor is the Half-track Fordson. This is a modification of the ordinary Fordson by which the two rear wheels can be replaced at will by caterpillar tracks, the front wheel remaining unaltered. A recent improvement of interest to Middle East countries is the replacement of its kerosine engine by a diesel engine of 40 H.P.

The foregoing English made tractors are of lower horse power than the majority of tractors now operating in Syria, but it is felt that all soils, all crops and all cultivation operations do not necessitate the use of very high-powered tractors and that the English tractor now available against sterling payment, in contrast to Americans against dollars, can find a place in the mechanisation of Syria's agriculture. Particulars of these tractors have been sent recently to Syria, as well as to other adjoining countries. It is suggested that they all merit a very early trial.

One point which the manufacturers make in connection with their tractors requires special mention. It is that they stress the absolute necessity for the existence of suitable and adequate arrangements and facilities for maintaining, repairing and servicing their tractors in any country which purchase them. They insist on such provision before they supply tractors and go so far as to say that in the absence of it they are unwilling to make sales. Most of these firms also require that foreign agents who will subsequently handle the sale and distribution of their tractors in countries abroad should proceed to Great Britain for a full course of training in the tractors concerned. The course lasts about one month and covers a detailed study of every part of the tractors in the factory and workshop, followed by practical training in the handling and use of the tractor in the field.

PUBLIC UTILITY CORPORATIONS

In view of the vast potential which the Jezireh possesses for agricultural development the suggestion is made that there could be no better organisation for undertaking this development than a Public Utility Corporation or a body like the British Overseas Food Corporation. Such a body would be likely not only to develop the tract much more quickly and on much sounder lines than can ever be expected if development is left to haphazard private enterprise, but it would require the minimum labour - an important factor in an under-populated country - and would serve as a model and demonstration for other parts of the country of what can be achieved, and how it should be done, when an enterprise combines business organisation and efficiency with up-to-date scientific knowledge. It is suggested that the possibility of utilising some such agency for developing the Jezireh be seriously examined, if a detailed investigation on the spot of all relevant facts should show it feasible. In order to show the achievements which can be accomplished by these means full details of the work, the organisation and of the manner of functioning of

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the Sudan Plantations' Syndicate, an organisation of comparable size, have been supplied to Syria, as have also details of some smaller development projects by public bodies, such as the Italian Colonisation Scheme in North Africa.

THE AGRICULTURAL DEPARTMENT

If the development of Syria's main industry is to take place on rational and sound lines and if its agriculture is to contribute to the inc-hased prosperity of the country to the maximum extent of which it is capable, the mere provision of various tools of development - increased irrigation, great quantities of chemical fertilisers, better seed, more tractors and their complementary machines, etc. - will be totally inadequate. These tools can make their full contribution only when there also exists the knowledge of the particular tools which are required in a particular case, the effect of their use and the capacity to use them efficiently on the part of those for whose benefit they have been provided. These essentials are forthcoming only as the result of research and education, and its here that the importance of the Agricultural Department lies.

Too much emphasis cannot be laid on the importance to a purely agricultural country, such as Syria, of a strong, efficient, progressive and keen Agricultural Department. It is the medium through which the various means of how to effect them is desseminated; in the organisation of Government it should provide the driving force by which known improvements are put into operation in everyday agricultural practice; it is to that Department of Government that the cultivators who form 70% of the entire population of Syria should look for leadership and guidance.

The Agricultural Department in Syria is not in a position at present to provide in full measure the leadership and guidance which are indispensible to orderly and sound progress. Its staff is inadequate; it is insufficiently highly trained in various essential directions; its present functions are too limited; even in the fields in which it does operate its activities are too restricted and it has not the facilities and equipment for undertaking certain lines which are fundamental to improvement and development. The rectification of this very unsatisfactory position is an immediate necessity and an unavoidable first step in such agricultural development programme as may be adopted. This applies to all the usual aspects of departmental activity whether they be education, research or extension.

Research

Research is the basis on which ultimately rest all improvements in agricultural practice and the capacity to obtain greater returns from this industry. Without it progress is at a standstill. Improvements seldom come to hand ready-made; they are usually the result of intensive investigations and experiments, scientifically conducted and thoroughly

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proved before they are put into practice. Syria has very inadequate provision for such research, either in scientifically trained staff or in the facilities which are essential for their work.

Not all the problems associated with the improvement and development of agriculture in Syria are special to that country or are unique or have not been explored elsewhere. Many of them have similarities and counterparts in other dealing with those problems. Whether the measures which have been devised to solve common problems and to suit other countries will be equally applicable to Syria, must be a matter for local investigation. There are other problems, however, whose solution must necessarily be worked out on the spot. The research staff whose appointment is so urgently needed in Syria will work, therefore, along two main lines: they will test out the local applicability of the means of improvement adopted in similar connections elsewhere, modifying them, if necessary, to suit local needs, and they will initiate and carry through original research on problems peculiar to Syria itself. They must be adequately qualified professionally for this work and they must be provided with all the facilities for it.

In agricultural countries which are scientifically advanced the number of specialist research officers is often very large for not only is there a large number of sciences which are applied to agriculture, but many of the sciences can be subdivided into sections or aspects, each of which can employ many experts. Thus, ordinary crops divide themselves naturally into groups such as cereals, fibres, oilseeds, etc.; economic botany is readily divisible into plant breeding, physiology, nutrition, agricultural chemistry into soils, fertilisers and manures, feeding stuffs. Advanced agricultural Departments not only provide individual research officers for each such group but often make secondary subdivisions and staff them accordingly.

Syria, however, has not yet attained and will not reach such a stage of development for many years and it is considered that initially the appointment of senior research officers can be limited suitably to:-

1. An Agronomist.
2. An Horticulturist.
3. An Economic Botanist.
4. An Agricultural Chemist.
5. An Entomologist-cum-plant pathologist.

These five officers constitute the indispensible minimum. Others could be added without difficulty but they are less urgently required.

It is a sound investment to give each senior research officer from the beginning at least one subordinate who is scientifically trained in his subject and who can relieve his superior of routine laboratory and field work, leaving him free to give his superior knowledge and experience to the more highly technical and difficult work. Governments have been known to provide laboratories, equipment and all other facilities unstintedly for their research officers, but to jib at the appointment of subordinate scientific "bottle-washers". This is an unwise attempt

at economy. Whilst only one technical subordinate has been suggested for each specialist initially, the number of required assistants will increase automatically as work develops.

Unless there be in other countries suitably trained and experienced scientific nationals of her own whose services can be obtained for the five senior posts which have been suggested, Syria will be unable for the present to fill these basic posts from within, and there is no alternative to the recruitment of foreigners on long term contracts. Even although immediate steps be taken, as suggested later in this note, to provide for the adequate education and training of scientific staff, a good many years must elapse before Syria's own nationals acquire the necessary technical training and after it the requisite degree of experience to qualify them to hold the top posts efficiently. The appointment of foreigners meantime will not only inaugurate the very important work which is to be done, but will enable progress to be achieved and will provide the necessary facilities for training up young Syrian scientists and to qualify them to succeed the outsiders in due course.

Agricultural Education

A progressive country has to provide a variety of types and degrees of agricultural education, which should cater at least for:

(a) the requirements of cultivators' sons who, on conclusion of the course of education, return to farm their own lands.

(b) various courses of different lengths and intensities to qualify those who take them for employment in the different grades of Government departmental service, particularly in the Agricultural Department but not necessarily limited to it, since agricultural education is a fitting background for staff of the revenue and other departments whose duties lie with and among the cultivator class.

(c) courses to meet the needs of those members of the public who propose to devote themselves to certain industries associated with agriculture such as beekeeping, fruit and vegetable preparation, the manufacture and repair of simple, improved implements of cultivation, dairying, poultry keeping, as well as to such skilled farm activities as the driving, operation and maintenance of tractors, oil engines and other highly mechanised machines associated with modern farming.

(d) the training of teachers of nature study and simple agriculture in elementary or middle schools of the Education Department.

The list of requirements could be increased but the foregoing examples are adequate to indicate the variety of types of education and training which should be met.

Elementary Schools

The teaching of nature study and elementary agriculture to boys in the higher classes or rural primary schools or in middle schools where they exist under the Education Department is now usually accepted as an important aspect of education and one which promotes agricultural development. Such instruction is given less, though both lines proceed simultaneously by thoratical training than by practical and visual demonstration in which the pupils do the operations under guidance. For this purpose each rural school must have at its disposal a small area of land which in different countries and places varies from a school garden of half an acre in which all the operations are done by hand, to a school farm of three to five acres, where the heavier cultivation operations are done by a pair of draft animals.

The early introduction of a scheme of this nature is of importance to Syria. If the policy usually adopted elsewhere in regard to it is followed, it would operate under the Department of Education with which the Agricultural Department would work in the closest cooperation and, in fact, would train the teachers of the subject and act as technical advisers to the former department on the running of the scheme. A special Teachers' Training Course will have to be opened at one of the agricultural schools in Syria. Selected teachers, already trained and experienced in teaching ordinary school subjects, but deemed specially suitable for specialising in agriculture, will take the course of training which will last one complete year. A good incentive for those who are thus selected is the grant to them of a small personal monthly allowance. If Syria desires assistance in drawing up plans for such instruction, copies can be supplied of the syllabus of the course given to teachers and that taught by them later in rural schools in some other countries.

The three existing Agricultural Schools in Syria give or propose to give, one type of course only - instruction covering four years, in only three of which agriculture finds place as a subject. The course is intended primarily for farmers' sons who are expected to return to the land on its conclusion. There are proposals also for opening more schools of the same type. It is unusual in other countries in the East for farmers to spare their sons for courses of such long duration if on their completion the boys merely return home unqualified for any official service. It is somewhat surprising that there should be in Syria a demand for an education of this type sufficient to warrant the setting up of so many schools to cater for it only. It is suggested, however, that a shorter course would suffice to meet the needs of the cultivator class and that a suitable rearrangement of the syllabus and of the subjects taught should make it possible to give adequate training of this nature in a maximum of two years.

An agricultural department, if it is to be efficient, required subordinate technical staff of different grades and calibres. There are, for example, the research assistants in the research sections, the demonstrators in the different sections of the Agricultural College, the assistants employed on district extension work, demonstration and propaganda,

and overseers who supervise the labour on experiemental farms, and plant overseers and fieldmen who perform simple routine technical duties for the research officers. The duties and responsibilities of the various classes of appointment require different standards of knowledge and technical skill. Agricultural education in Syria should be so graded as to cater for all these requirements as soon as possible.

Research and teaching duties call for qualifications and training of degree standard. For the present Syria will be unable to provide internally agricultural instruction of that quality. It will be necessary to send abroad, as is being done at present, selected students for an education of that class, and in the meantime to employ other nationals who possess these qualifications. In this connection, however, it is felt strongly that an higher level of basic education is very desirable than that possessed by those who are now being sent for study in outside countries. As soon as possible, the standard should be equivalent at least to matriculation for those whose services are to be employed subsequently by Government on research and teaching duties. Further, they should possess a sound knowledge of English, both because it will enable them to extend the field for study into western countries from which the lack of it now debars them and because so much modern scientific literature is written in that language.

Hosh Kharabo

The needs of Syria require that both the standard of education for admission to the new agricultural school at Hosh Kharabo, near Damascus, and the curriculum and standard of instruction to be given in it, should be on a very much higher plane than those connected with the existing three agricultural schools. This school should be developed, in fact, as an high-grade Agricultural College which in due course can become the Faculty of Agriculture of a local University. It should provide a variety of courses of instruction suited to different classes of needs. If it is developed on those lines the five senior research officers whose appointment has been proposed can act, in the initial years at least, as heads of the teaching sections of their respective subjects in the College. Such joint duties are often performed in similar circumstances in other countries and though the combination may reduce the time available for all-important research, it is the most economical arrangement in the early years. In the event of such a combination Hosh Kharabo would naturally become the main centre for the research work also. It would, in fact, be not only the Agricultural College but also the Research Institute, and its buildings would have to be planned and expanded accordingly. Facilities of certain kinds would have to be available to the research officers in the rainfed areas also for the study of problems for which the artificial irrigation conditions of the Damascus area are not suitable.

Syria's Agricultural College and agricultural schools must develop on lines suited to the demands and needs of the country. The varied nature of these requirements in an agricultural country may not be fully realised but may be judged from the following list of courses given in the foremost Agricultural College in India, a College which puts through its classrooms some 600-700 agricultural students of all types annually.

The College is affiliated to the University of the Province in which it is located and, therefore, is of degree standard, though, as will be seen, it also gives many courses far below that level.

1. A 4-years course in agriculture for the B.Sc.(Agr.) degree. The first two years are uniform for all students. During the last two years each student specialises in some particular aspect of agricultural science, e.g. agronomy, plant breeding, plant physiology, plant pathology, entomology, agricultural chemistry, animal nutrition, etc. etc. All instruction is given in English.

2. A 2-years post graduate course for the degree of M.Sc.(Agr.) in one of the specialised subjects just mentioned.

3. A 2-years diploma (Leaving Certificate) course, in agriculture and the science applied to it, for farmers' sons who wish to return home to the land at its conclusion. Instruction is in English.

4. A one-year's Vernacular Course in general agriculture. The instruction is mainly practical and it is given in the local language. The course is intended for farmers' sons who do know English and also for those who wish to qualify for departmental employment as overseers of labour on experimental farms, plant and fieldmen observers in research sections and head labourers on district extension work under an agricultural assistant of degree status.

5. A one-Year's Teachers Training Course is given in the local language to qualify for the teaching of rural science and elementary agriculture in ordinary middle schools.

6. A one-year's course of practical training in fruit and vegetable growing to qualify for private employment as head orchard man.

7. A 9-months' course on Advanced Fruit and Vegetable Preservation for those desiring employment in industrial concerns of this nature. The instruction is given in English.

8. A 6-month's course in Dairying, given in the local language to those who wish to obtain employment in the dairying business.

9. Various courses, each of 15 days' duration, in the preparation of fruit and vegetable products, held both in winter and summer to cover the whole range of fruits and vegetables. They are for housewives and deal only with the preservation and preparation of such products for the home and not for commercial purposes.

10. Short courses, each of 15 days' duration, in various practical operations connected with fruit culture, such as budding and grafting, and pest and disease control.

11. A 15 days' course for private Estate Managers to bring them up to date in all the latest improved agricultural practices.

12. Courses in practical bee-keeping, each of two months' duration.

13. Blacksmiths' courses, each of two months, to train village blacksmiths in the repair of simple improved agricultural implements.

14. Refresher courses for the departmental staff of all grades to keep them up to date and in touch with all the latest discoveries and developments.

Syria is not yet in a position to attain to such heights. They have been reached gradually through years of steady departmental development and have been enumerated here merely to illustrate the varying nature of the needs for which Syria should aim at catering as time goes on. It is suggested, however, that apart from developing a general agricultural education at the Hosh Kharbo School of Agriculture on a level much higher than the existing schools, Syria should also initiate courses at the earliest opportunity, (a) to train teachers who will introduce the nature study and elementary agriculture into rural schools, and (b) to train drivers and mechanicals in the running and maintenance of tractors and agricultural machinery. It might be desirable to earmark two of the schools of agriculture which are now being set up or are in contemplation, for these special purposes rather than continue them all on the present single purpose basis.

Extension work

Though the basic qualifications and training needed for this type of work are generally lower than those which are essential for research and teaching, a sounder general agricultural knowledge is needed than that possessed by the existing staff as a whole. Many of them are inadequately qualified technically to perform their functions efficiently and future recruits should be of an higher calibre.

Farms

In number the Agricultural Department is now moderately well equipped with farms but, owing to the great stress which it lays on fruit and ornamental tree nursery work, a very considerable portion of each farm is lost to the research staff for agronomic and horticultural investigations. It is felt that, if these investigations are to be carried out on the scale which is necessary, the areas assigned at present for this work on the majority of the existing farms will prove inadequate and must be extended as the need arises.

For one type of farm - the seed farm - the Department has no separate provision. Farms of this kind are of inestimable value in the evolution of improved varieties of seed. When a new variety of a newly introduced crop has passed all the required tests on the experimental farm and it is decided to put it into general cultivation, the need for seed multiplication arises before it can reach the growers. The seed farm supplies the Department with the means of producing it in the earlier, if not at all, stages. In the usual sequence of pure seed to the agronomist who multiplies it through one, two or more generations till its bulk is either adequate for final distribution or till it can be further multiplied by selected growers under special arrangements before it is distributed.

The desirability of establishing a number of seed farms in Syria should be seriously considered. They have proved invaluable elsewhere. They are usually farmed directly by the Agricultural Department or through tenants under its supervision. Usually no expenditure finally results through operating them but often they bring in a substantial income to the Department, in addition to the large quantities of seed which they provide for the ordinary cultivator. They further act as demonstrations of good husbandry to the surrounding area since it is usual to farm them by all the latest improved methods and practices known to the Department. Provision should be made for farms of this nature when new tracts are being colonised or cultivation is being extended to new areas. The area of each farm may range from 500 to 3,000 acres, or even more, according to the needs which they are intended to serve.

Finally, it is felt that the special conditions which maintain in the Jezireh and the great possibilities which that district offers, warrant the location of a good farm for rainfed agronomic research and horticultural investigations in the Kamishliye area. The well-chosen and attractive farm recently established at Hassetche is unlikely to fill the needs of the district adequately for, not only is its area too small, but it can produce satisfactory crops only under irrigation, whereas the main cropping lies in the rainfed areas further north.

Note. The failure to consider the animal husbandry aspect of the agricultural development of Syria in these notes must not be taken as implying that it is of little significance to the country. On the contrary it is of great economic importance, particularly to the Bedouin and nomad tribes. It is expected, however, that it may be later the subject of an independent note from another source.

July 31, 1948.